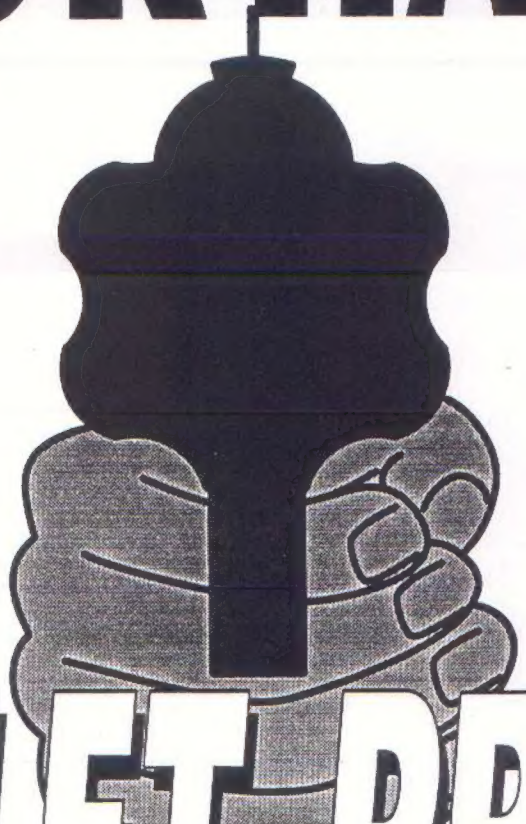
POOR MAN'S



BULLET-PROOF VEST

By: John J. Williams and Josey Wales

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THE POOR MAN'S BULLET-PROOF VEST

By John J. Williams

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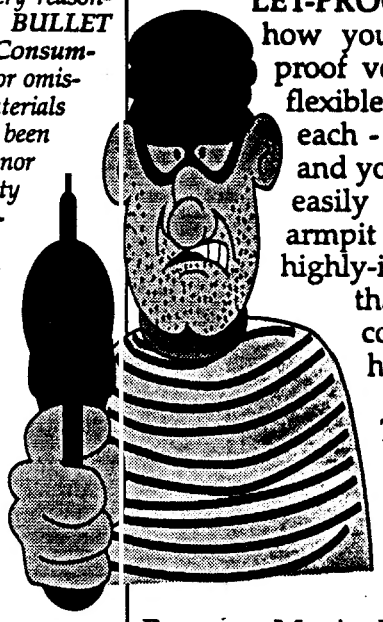

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INTRODUCTION

We live in a very dangerous world! With violent crimes up - particularly shootings and stabbings - death can come suddenly, unexpectedly and violently! You can be shot dead in the streets by a ricochet from a gun fired blocks away! Even school children are at risks with streets and schools now increasingly becoming free-fire zones!

One major solution to much increase the chances of your survival and that of your loved ones is to use bullet-proof vests. <u>There is one crystal clear fact: Once somebody is shot or stabbed to death, it's too late to worry about putting a protective vest on him or her!</u>

Unfortunately, commercially-made bullet-proof vests costs $100s each, and some firms will only sell their best ones to law enforcement and the military and the less effective overpriced ones to the public. Further, commercial vests leave gaps above the shoulders, below the hips and at the armpits that cost lives! The "POOR MAN'S BULLET-PROOF VEST" describes in detail how you can make homemade bullet-proof vests, using commonly available, flexible materials, for typically $30-$50 each - all that you need to protect you and your loved ones! And how you can easily add on head, neck, genital and armpit protectors. And how to make highly-insulating bullet-proof panels that you can slip into the linings of coats, jackets, hats, car doors, home walls, etc.

There are some types of assaults that no bullet-proof vest (BPV) provides substantial protection from:

(1) Any wound or injury to a part of the body <u>not covered</u> by the BPV. However, since the **Poor Man's Bullet-Proof Vest (PMBPV)** described herein can be made to cover most of your vital organs and your biggest target (your torso) and most gunshot and knifing deaths occur to the torso, the vest protects you against most such attacks.

(2) Bleeding to death by a wound bad enough to cause massive bleeding. However, since the **PMBPV** is nonporous, it may compress a wound or be pressed on to compress a wound to reduce or even stop bleeding.

(3) Unfortunate consequences of an attack. For example, while fleeing an assailant, you get hit by a car. Or you fall and hit your head on a brick. Or you suffer a heart attack.

Even if the **PMBPV** doesn't stop the blow 100%, it

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can diminish it to a point where what would have been a fatal wound becomes a non-fatal (perhaps even minor) one. There are some types of assaults that the **PMBPV** will provide maximum protection against:

(1) Small-calibre bullets.

(2) Slow-moving bullets, and bullets fired from long distances away.

(3) Wide-diameter bullets, including some larger, heavier calibres.

(4) Bullets with a blunted nose, including dumdums, hollow points, soft noses, black talons, etc.

(5) Bullets that explode, fragment or tumble upon contact. Bullet fragments tend to get entangled in the fibers, and if they do pass through the **PMBPV**, they tend to be bound together in the fiber-sealant matrix and are thus usually easier to find and spread less in the underlying material (for example, in the wound).

(6) Glancing or angle shots. The smaller the angle of the shot from the surface of the body, the more protection that the **PMBPV** provides.

(7) Ricochets - one of the biggest killers of innocent bystanders in drive-by shootings. Because a ricochetted bullet is usually flattened by the impact, it is better stopped by the **PMBPV**.

(8) Shotgun blasts, particularly at distance, using a light load and-or 14- or 20-guage.

(9) Knife stab wounds. A knife plunged into a **PMBPV** will often break the blade or entangle it in the vest so that it then cannot be used to stab again.

(10) Other sharp weapons such as ice picks, screwdrivers, scissors, hatchets, etc.

(11) Blows from blunt weapons like lead pipes, tire irons, hammers, rocks, boots, etc.

(12) Explosive shrapnel (depending upon shape, mass, hardness and velocity).

(13) Fire, high heat and splashed burning fluids. Because the **PMBPV** is nonflammable and heat-resistant, it also protects the wearer against fire, high heat and splashed burning fluids.

(14) Stun guns and tasers. Since the **PMBPV** is highly electrically insulating and it prevents the high-voltage electrode from contacting the skin, the **PMBPV** is very effective against stun guns, tasers and similar high-voltage weapons.

(15) Vehicle, motorcycle, bicycle, boat, airplane, skate, skateboard and other crashes and falls. The **PMBPV** offers better protection from blunt trauma caused by crashes, jumps, falls, slips and other impacts.

(16) Because felt is lighter than water and the sealant used with it repels water (and other fluids), the **PMBPV** floats on water and thus helps keep the user afloat. However, it is not as good as commercial flotation jackets and devices.

(17) Because felt is an excellent thermal insulator and the **PMBPV** repels water, the **PMBPV** is excellent for making jackets and coats and for using inside of jackets and coats as insulating panels in lieu of the material normally used. <u>Never assume that because you are wearing a BPV, you now can take greater risks or become reckless.</u> The **PMBPV** is only a partial shield, and like any BPV you may use, it can not and does not make you invincible.

There are some types of assaults that the **PMBPV** (as well as most commercial BPVs) will provide minimum protection against:

(1) High-velocity bullets, such as those fired by "deer rifles" and "assault rifles" that fire rifle ammo.

(2) Hot loads (ie: ammo that has been factory or hand-loaded for high energy).

(3) High penetrators, including FMG (full-metal jacket), teflon-coated and armor-piercing bullets.

(4) Bullets fired at point blank, particularly perpendicular to the surface of the body.

(5) Sharp, heavy-bladed knifes (ex: hunting knives, bayonets, swords, spears, etc), particularly when driven with great force perpendicular to the surface of the body.

(6) Heavy or hard-driven chopping weapons, such as axes, large meat cleavers, broad swords, etc.

(7) Heavy or hard-driven blunt weapons, such as sledge hammers, etc.

(8) Explosive shrapnel that is high-energy,

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hard, massive, sharp and-or pointed.

The most common ammo calibre of the street is 9 mm - a mid-calibre ammo popular with many automatic and semi-automatic weapons. These weapons include UZIs, Tech-9s, Mac-9s and most mid-sized handguns known as "automatics" (actually, they are semi-automatic). Other popular calibres include .22 Long, .38 Special, .357 Magnum, .380 ACP, .45 ACP, .223 and the .308 Russian. The .38 Specials and .357 Magnums are exclusively used by revolvers - the .38 Special being originally police issue. .22 Long is used by smaller rifles, revolvers and automatics. .380 ACP is used by automatics just under 9 mm size. .45 ACP is used by the largest automatics, and some machine guns (ex: Mac-10s). The .223 is the calibre used by the Mini-14, AR-15 type assault rifles. The .308 Russian is a rifle calibre common to the AK-47 assault rifle. In addition, a number of different shotgun type rounds are popular, where used, including deer slug, "00", etc. However, the streets don't limit themselves to these calibres - virtually any ammo that is made in the world in quantity can be found on the streets these days, altho these calibres are the ones that are the overwhelming favorites.

Note that calibres are expressed in two different ways. Both ways are an expression of the bullet (ie: gun bore) diameter. If the calibre # is followed by a "mm", this stands for millimeter. Thus, "9 mm" means that the diameter of the bullet is 9 millimeters (about 0.354 inches). If the calibre # is preceded by a ".", then the # that follows represents the diameter in terms of thousandths of an inch. Thus, ".308" means that the diameter of the bullet is 0.308 inches.

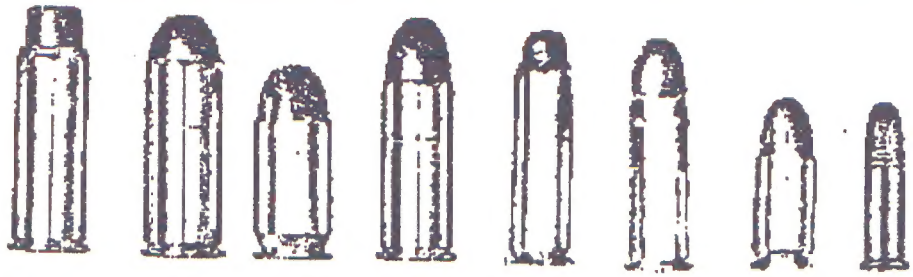
A lot has been stated and debated about the "Stopping Power" or SP of ammo. The commonly accepted definition of "Stopping Power" is, *"When an unprotected adult male human being of average height, weight, strength and determination is hit with this bullet while attacking, to what degree does the hit stop his attack?"*

Of course, conditions between the theoretical SP and what you'll be exposed to in the streets can vary widely. However, through much experimentation, it has been determined that the SP of an ammo is roughly proportional to the diameter of the bullet times the mass of the bullet times the velocity of the bullet. Since most bullets are mostly made of one material - lead - bullet mass is usually proportional to the square of the bullet's diameter times its length. Thus, a wider, heavier, slower bullet like a .45 ACP has a slightly higher SP rating than the .357 Magnum. Also, the type of bullet can much increase the SP rating of the ammo. For example, dumdums, hollow-points, black talons, tumblers, and exploding and fragmenting bullets have much greater SP than FMG bullets, which normally cleanly pass through the body.

SP and BPVs are reasons why many police forces have gone from .38 Specials to .357 Magnums. There is one case where a large, determined attacker, strung out on drugs, has killed two police officers pumping 11 .38 Special bullets into him, and lived long enough to stand trial!
The accepted definition for SP does not apply to a person using a BPV for the same reasons that it does not apply to animals like the bear:

(1) Since people wearing BPVs are usually acting in a defensive (or at least partially defensive) posture (similar to the typical bear being hunted), and not attacking, the SP definition usually obviously doesn't apply.

CALIBER COMPARISONS



	44 Mag.	45 Colt	45 ACP	44 Spec.	357 M.	38 Spec.	9 mm	22LR
Bullet Weight (grain)	240	255	230	246	158	158	115	40
Muzzle Velocity (ft/sec)	1470	860	850	755	1410	855	1140	1255
Bullet Area (sq. in)	0.146	0.159	0.159	0.146	0.102	0.102	0.102	0.038
Relative Stopping Power	1.0	0.677	0.600	0.526	0.441	0.267	0.260	0.037

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(2) Since the BPV must be penetrated before the bullet can do its damage (similar to the thick, heavy coat of the bear), it much better protects against wider and heavier bullets (and those that mushroom, explode, fragment and tumble upon contact) that provide great SP in unprotected people.

Thus, for the person effectively using any BPV, PENETRATION is the single most important consideration in arriving at any similar figure as "Stopping Power".

As you can see, as with anything, the protection provided by the **PMBPV** is relative. It's purpose is to substantially decrease the risks of you getting seriously injured or killed from an attack using a weapon. Again, it cannot guarantee that you won't be seriously injured or killed.

MATERIALS USED IN THE PMBPV

When we undertook this research, we were looking for BPV materials that met all of these requirements:

(1) Effective materials for a BPV design - materials that demonstrate the greatest resistance to bullet and blade penetration.

(2) Materials that, should they enter the body due to an assault, will have no or minimal toxic effects upon the body.

(3) Relatively inexpensive material(s). Since the rich can easily afford commercial BPVs, the **PMBPV** materials must be affordable by average and poorer people.

(4) Materials that are relatively easy for most people to obtain.

(5) Materials that are relatively lightweight and flexible.

(6) Materials that are relatively easy and safe to prepare and to wear. The materials must be as inert and as nonflammable as possible.

(7) Materials that can be used in different configurations and in combination with other common materials.

As you may know, Kevlar is the material most commonly used in commercial BPVs. It's relatively effective and relatively lightweight. However, it's very expensive and hard to buy. According to what we've been told, most dealers of commercial BPVs grossly overrate the ability of their vests to protect you.

Through exhaustive searching and experimentation, we have found that the **PMBPV** requirements are best met by using a combination of a material called "felt" and silicone rubber sealant or cement, usually mixed with common quartz beach sand.

Felt is a cloth made of wool and fur often mixed with synthetic and other natural fibers joined together by using heat, pressure, moisture and chemicals. Felt is a tough fiber that is difficult to cut. It is usually dark grey in color, however, you may find it dyed various colors. Felt is normally available in rolls, but is also found in pads. Felt commonly comes in various thicknesses ranging from about 0.1" to 1.0".

Felt comes in various qualities. Some types are loose and "hairy" - others are tight and tough. The thickness you are looking for, depending upon the technique described below that you choose to use, is between 0.1" and about 0.5".

You may already know that felt is commonly used in hats. However, since most communities don't have hat makers any more, you need to also know that it is commonly used to line car trunks, as an insulator, and as a sound and vibration dampener (in fact, felt is such an excellent sound and vibration dampener that we also use it as cushioning under our computers, printers, faxes, etc).

Felt is not known to be found at discount stores like K-Mart or Walmart. The places most likely to carry felt are (if not in stock, ask them to order it for you or to direct you to a source): Upholstery shops (particularly those that do cars), car body shops, car dealerships, carpet stores, fabric stores, and janitorial suppliers. Because felt is not considered to be a standard item in even many of these types of businesses and prices can vary wildly, you should call first for availabilities and prices. **Consumertronics** does not sell or supply felt or anything else described herein..

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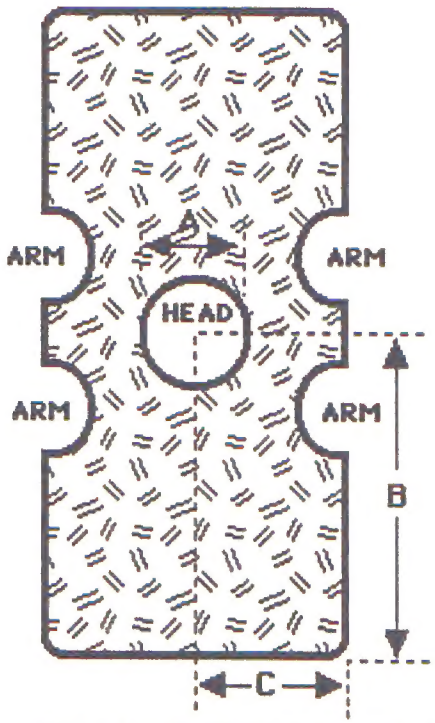
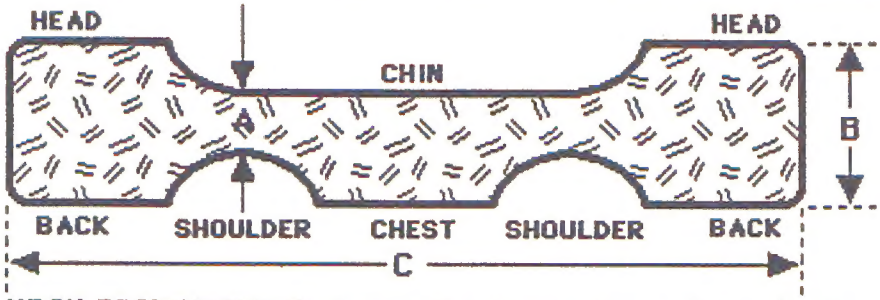
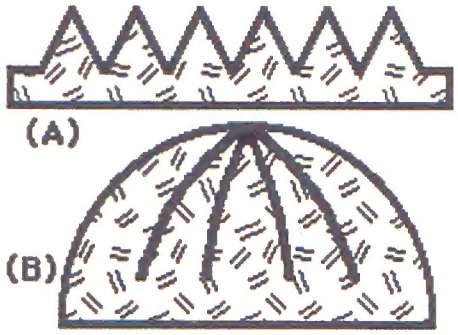


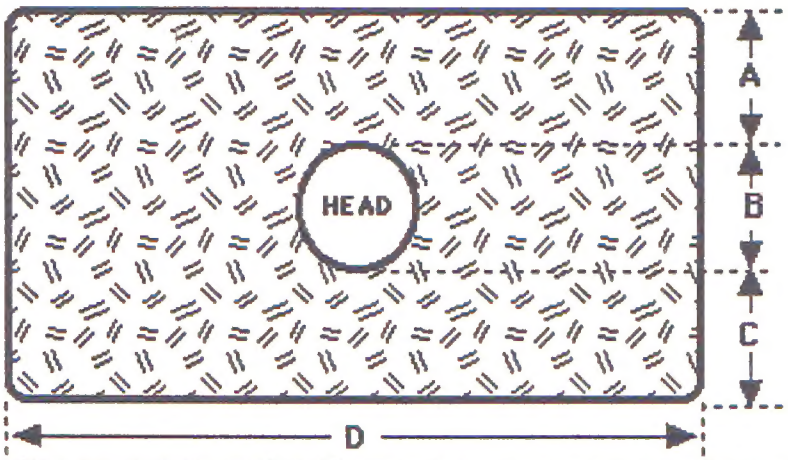
BULLET-PROOF VEST (BPV): Protects chest, back and sides. A=Head diameter + 10%. B=Distance from neck middle to about 4" below the crotch.



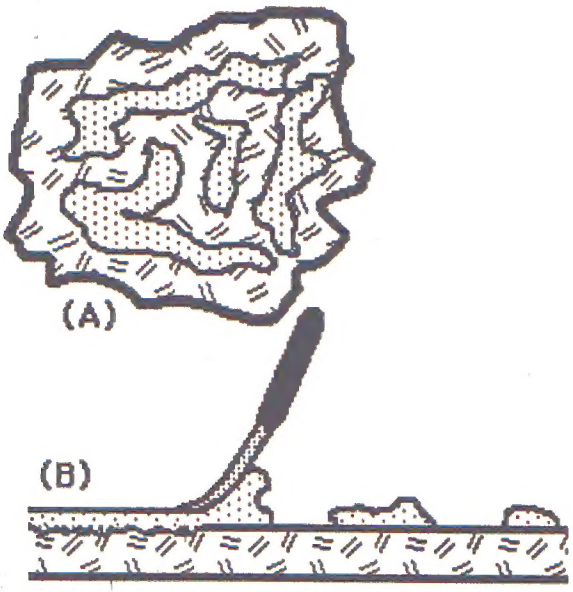
NECK PROTECTOR: Protects the neck, upper chest, back of the head and upper back. A=Neck length. B=Depends upon desired coverage of back of head, upper back and chest. C=Circumference of neck + 2".



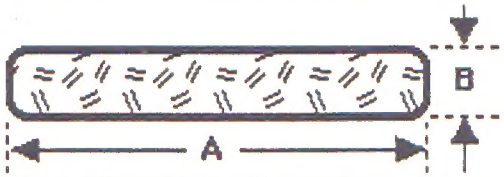
BULLET-PROOF CAP: Protects the head. Can be worn by itself or under a hat, cap or jacket hood. (A) Cut pattern. (B) Completed cap. (A) and (B) are not drawn to scale.



BULLET-PROOF PONCHO: Can be worn with or without BPV. Protects the heart, lungs and upper back. A=Distance from back of neck to about mid-back. B=Head diameter + 10%. C=Distance from front of neck to top of stomach. D=Elbow-to-elbow distance (over the shoulder). Also protects the upper arm and armpit areas left vulnerable by commercial BPVs.



DISPENSING SILICONE SEALANT: (A) Beads of sealant on the felt. (B) Spreading the sealant with the putty knife. Sealant is mashed into the felt fibers. Allow 24-48 hr for curing.



BULLET-PROOF HEADBAND: Protects head. A=Head circumference + 2". B=1" to about 5".

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Note that what building supply stores call "felt" is NOT what you are looking for. Their "felt" is actually black roofing paper and easily punctured. You need real felt - the type of felt like that used in hats. Also, felt is found in SOME janitorial suppliers and is used as a floor polisher. Janitorial suppliers also have two products used for floor buffing that aren't felt but may look similar. One is a colored pad (usually green), about 1/4" thick, made out of woven plastic. We've tried it and found that with or without the sealant, it offers only minimal protection. The other is a pad made from hog's hair, about 1" thick. Embedded in sealant, it appears to offer some protection against larger diameter, slower bullets. However, at 1" thickness, it is not practical for clothing wear; but it could be used in car doors and other structures.

Silicone rubber sealant - sometimes called "silicone sealant" (or "cement"), "RTV" or just "caulking" - is widely available in department stores like K-Mart and Walmart (where it's usually cheapest) and building suppliers. The purpose of the silicone rubber sealant is simple: It binds the fibers in the felt so that the felt becomes more tough and resistant to penetration. It is liberally applied to all outer surfaces of the felt and between felt layers if layering is used.

When looking for this product, consider the following:

(1) Since the small tubes (2.8 oz) of silicone rubber sealant are much more expensive per unit as the big tubes (10+ oz), it is much more cost effective to buy the big tubes. Since for a typical adult **PMBPV** you'll need 3-5 10+ oz tubes, try to get them on sale or discounted due to quantity. What you don't use on your **PMBPVs**, you can use for normal caulking, cementing and insulation purposes.

(2) Brand of manufacture does seem to make a difference here. GE is the most expensive, but it also seems to hold onto the felt fibers more tightly.

(3) Unless you are fashion-conscious and you intend to use the BPV material as outerwear, sealant color is not important.

(4) Avoid water-based silicone sealant - it just isn't as good for this use.

(5) Avoid latex, "liquid nails" and other types of similar products. They don't bind the felt fibers nearly as tightly as silicone sealant does. Also, many of these materials are more toxic to the body if pieces get into the body if penetrated by a bullet or blade, and more toxic and inflammable to use. Silicone sealant is, as far as we can determine, does not produce long-term harmful effects to the body when placed into the body in small dry quantities (as opposed to broken breast implants, which leak liquid silicone to the body). Further, most of the **PMBPV**'s material that may enter the body due to an assault will either be clinging to the bullet or be located in or near the bullet/knife path, and thus can be quickly removed.

(6) Silicone sealant comes in various viscosities. Usually, what's labeled as a "seal(ant)", "glass seal(ant)" or "windshield seal(ant)" is less viscous than that labeled as "caulking" or "cement". If possible, get the less viscous sealant that you can because it penetrates and holds the felt fibers better and is easier to spread.

We have found that adding a clean, dry, generous portion of coarse quartz beach sand (pure silicon dioxide) to the silicone sealant during the application process much improves the strength of the **PMBPV** (carborundum or industrial diamond powder are even better, but they're harder to get and much more expensive). Be sure to mix the sand and sealant thoroughly so that you don't have clumps of sand or areas of pure sealant. Note that sand adds much weight to the garment, and can make it heavier than water. On the other hand, sand also makes it more fire resistant. Sand is inert and has no known toxic effects should it enter the body. Sand can be purchased from building supply stores (and stores that sell de-icing salt), as it is an ingredient in concrete. If you live near a beach or sandy area, you can usually get your own.

THE PROCESS OF MAKING PMBPVs

Of course, to apply the silicone sealant to the felt, you need a putty knife. We have found that one that is about 3" wide is most useful. Also, the putty knife should have medium blade flexibility. If it's too stiff, it's harder to force the sealant into the fibers because the angle is too vertical. If its too flexible, you can't apply enough down-

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ward pressure on the sealant.

You will also need some type of cutting tool for cutting the felt. We recommend that you use either a pair of sharp industrial-grade carpet scissors or any sharp non-serrated knife. CAUTION: **whenever you use any sharp or pointed instrument, you must take precautions accordingly to avoid cutting or stabbing yourself or any other person, pet or thing that comes in contact with the blade.**

You will also need a work area for making your **PMBPV**s. Your work surface may be the floor or a table - whatever is most comfortable and available to you. The work surface should be flat, level, sturdy and uncluttered. The area should be clean, dry, heavily ventilated and roomy. Working outdoors or in an airy porch is preferred. Never work with silicone sealant alone - always have another person handy to help you if you need it. When used properly, it is not known to be harmful to most people (certainly far less risky and potentially harmful as a stray bullet!).

The work area should also be free of disturbances and distractions, such as phone calls, visitors, kids and pets. Silicone sealant starts to cure fairly quickly, so anything that takes you away from the job partially done can harm the final result. Here, an assistant can help you by dealing with disturbances and distractions.

When you make a **PMBPV**, you need to be able to fasten various parts together to make a good fit. We have found that velcro works best. You can buy velcro from some large office supply stores, like Bizmart, and small pieces from Radio Shack. All you need is the part of the velcro that has the little plastic hooks - not the part with the cloth. Do not apply sealant to the areas requiring velcro, as they must be bare for the velcro to work. This is done by applying masking tape to the areas requiring velcro prior to applying the sealant, then stripping off the tape after the sealant dries.

Fastening can also be done with lacing. Lacing requires punching or drilling facing holes in the garment big enough to allow lacing to pass through them. Punching and drilling should be done after the sealant is applied and dried, if no sand is used with the sealant. If sand is used, punch or drill before applying the sealant/sand combo, then ream out filled holes.

A **PMBPV** is made in the following fashion:

(1) Set up the work place, and make sure that all tools and materials are readily at hand. Make sure that the felt is clean and dry. If it's dusty, dust if off well. If it's dirty, oily or greasy, wash it thoroughly. Then allow it to thoroughly dry. How well the **PMBPV** works depends upon how well the sealant secures the fibers. If the fibers are dirty, oily, greasy or wet, the effectiveness of the sealant substantially diminishes.

(2) Take measurements of the parts of the body to be protected. See figures for typical garments that can be made. Make a fully-dimensioned reduced-scale sketch of what you want to make. Since body types vary, the final shape of the garment may differ substantially from the figure.

(3) Reproduce the sketch, full-size and to scale on the garment.

(4) Since it is much easier to cut the felt uncoated, carefully cut out your garment now. Then, to be sure of fit, try out the uncoated garment on the body to be fitted. Because the coating will add thickness and because you may also want a loose fit for better venting, the garment should fit somewhat loosely. Allow for at least a one-inch overlap for each seam if possible. Every seam in the garment adds to the risk of injury or death. When a bullet or knife strikes a material, it tends to seek the path of least resistance. If you use what's called a "butt seam" (two edges butted up against each other), the path of least resistance is the seam. If you are shot or stabbed even inches away from a seam, the bullet or knife blade may slide into the seam and then thru it and into the body. Therefore, all seams should be overlapped by at least one inch, and then sealed tightly.

(5) If your garment is going to be multi-layered, cut out a garment for each layer.

(6) When fitting the garment, use a magic marker to indicate which top layer surface areas of the garment will require velcro for proper attachment.

(7) Place the garment on a flat surface (a piece of cardboard will do fine) that is at least one inch bigger on each side than the biggest dimension of the garment. Apply masking tope to all areas where velcro will be required.

(8) If you are going to mix the sealant with clean, dry quartz beach sand, dispense a liberal amount of sealant on a flat board to the side of the garment, then thoroughly mix the components together, then spread it onto the garment. If no sand

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is to be added, dispense the sealant directly onto the garment.

(9) Evenly distribute the sealant over the garment using the putty knife or similar. Apply firm pressure to the putty knife so that the sealant is forced as deeply into the felt matrix as possible. Be sure that all surfaces are liberally covered.

(10) Allow the sealant at least 24 hours to dry for all external surfaces and 48 hours to dry for all sandwiched surfaces. Do not disturb the garment during this time, other than to quickly move it with the material it rests on to a clean, dry and flat out-of-the-way place immediately after applying the sealant.

(11) Turn the garment face down, then repeat steps (7) - (9). Multi-layered garments should be coated on both mating surfaces, as described above, and then one wet mating surface is carefully placed on top of the other wet surface. Then a sturdy board is quickly placed on top of the mated pair, and then weights (ex: cinder blocks, barbell plates) should be put on top of the board to more forcibly force the sealant or sealant-sand combination into the felt matrices.

(12) Carefully inspect the garment. There should be no gaps or weak spots. Put the garment on, and attach the velcro strips. Get the feel of the garment.

CAUTION: KEEP PLENTY OF PAPER TOWELS AND WATER AVAILABLE. AND KEEP THE SEALANT OUT OF THE EYES AND ALL BODY ORIFICES AS IT IS AN IRRITANT. IF YOU BECOME ILL WHILE WORKING WITH SILICONE SEALANT, STOP IMMEDIATELY AND TAKE YOURSELF OR BE TAKEN TO AN AREA OF FRESH AIR. IF YOU REQUIRE MEDICAL HELP, SEEK IT IMMEDIATELY - DON'T WAIT. POISON CONTROL IN YOUR AREA MAY BE VITAL TO YOU, SO KEEP THEIR PHONE # HANDY.

CAUTION: SOME PEOPLE ARE ALLERGIC TO SILICONE. THESE PEOPLE SHOULD NEVER BE EXPOSED TO IT IN ANY FORM OR USE. Silicone sealant contains ascetic acid - the same stuff found in vinegar. Ascetic acid makes some people headachy or nauseous.

Note that no material described herein as a PMBPV material is considered to be highly inflammable. Contrary to most cements and sealants, dry silicone sealant won't sustain a flame. From our testing, wet sealant may sustain a flame only for a short period of time. Felt may smolder under some conditions.

Since the finished garment is non-porous, it will protect the wearer from water and other liquids. However, it will also not permit him or her to vent perspiration. Because of this, a layer of absorbent material, such as cotton cloth, should be added as a liner between body and the **PMBPV**. This may be in the form of T-shirt or cloth cemented to the **PMBPV**. Also, the **PMBPV** may be worn loosely to allow for venting of the body. If worn loosely, adjustment in the garment size should be made accordingly.

Since the **PMBPV** has a strange outward appearance, we recommend that you use it with a loose nylon windbreaker. For bullet-proof neck protectors, you might cover them with a scarf or a turtle neck or Nehru-style shirt, sweater or jacket. For bullet-proof caps and headbands, you might conceal them with a hat, cap or jacket hood.

The best of successes in all that you do.

--- John J. Williams, Consumertronics

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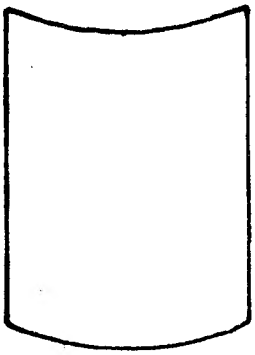
TABLE I MATERIALS SUMMARY Ballistics and Cost

Threat	Armor System	Areal Density lbs/ft^2	Areal Density Kg/m^2	Thickness mm	Thickness in	Cost in Dollars M^2	Cost in Dollars ft^2
.30 A.P. M.V. 840 m/s	Boron Carbide/Kevlar®	7	34	18	0.71	5920	550
	Alumina Al_2O_3/Kevlar®	9.5	46	19.9	0.78	727	67.50
	Dual hard steel,	11.5	56	7.15	0.28	495	46.00
	Aluminum	19	93	34.5	1.36	307	28.50
	R_C 55-56 steel	12	59	7.47	0.29	258	24.00
.30 Cal. Ball	Steel (RHA)	17	83	10.6	0.42	226	21
	Steel 500 BHN	11	54	6.86	0.270	148	13.75
	Dual hard steel	9	44	5.6	0.22	54	45
	Aluminum	14	68	25	0.985	226	21
	Kevlar® (laminated)	9.25	45	35.2	1.39	1493	139
	Alumina Al_2O_3/GRP	8.1	39	14.0	0.55	300	27.90
	Alumina Al_2O_3/Kevlar®	7	34	13.6	0.53	463	43
Fragments 250 grains 3000 ft/sec (915 m/sec)	GRP	15	73	36	1.42	848	78
	Kevlar®	9.5	46	36	1.42	1534	142
	Aluminum	14.5	71	25.4	1.0	242	22
	Aluminum/Kevlar®	11	54	24	0.95	473	44
	Aluminum/GRP	13.5	66	27	1.08	392	36
	R_C 55-56 steel	22	107	14	1.54	474	44
Fragments 50 grains	Non-laminated Kevlar®	3	14.5	13	0.50	484	45
.30 A.P and Fragments 250 grains 3000 ft/sec (915 m/sec)	Boron Carbide/Kevlar®	9	44	23.5	0.93	7395	687
	Boron Carbide/GRP	9	44	23.5	0.93	7074	657
	Alumina/Kevlar®	11	54	21.5	0.85	747	69
	Alumina/GRP	12.5	66	22	0.87	459	43
	Steel R_C 55-56/Kevlar®	12.5	61	17.4	0.683	689	64

ARMOR PLATES



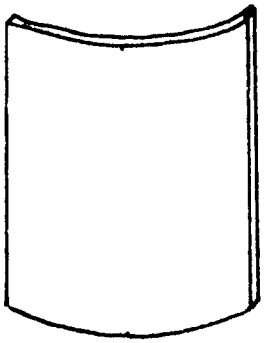
STEEL

DUAL HARDNESS
(LEVEL III)

SIZE: 10"X 13" (25cm X 33cm)
WEIGHT: 9.5 lbs. (4.3 kilos)
THICKNESS: ¼" (.6cm)

DEFEATS:

7.62 NATO Ball, 150gr. FMJ
.30-06, M2, Ball, 150gr.
.30 Carbine, 110gr. FMJ
.223 (5.56mm), M193 Ball, 55gr.
7.62 X 39, Ball (Soviet), 123gr.



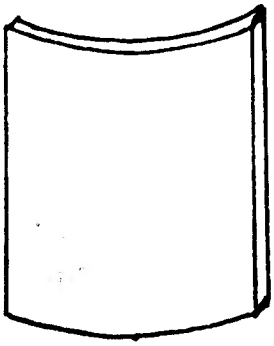
CERAMIC

MONOLITHIC
(LEVEL III)

SIZE: 10" X12" (25cm x 30cm)
WEIGHT:5.75 lbs. (2.6 kilos)
THICKNESS: 5/8" (1.6 cm)

DEFEATS:

7.62 mm NATO Ball, 150 gr. FMJ
.30 -06, M2, Ball, 150 gr.
.30 Carbine, 110 gr. FMJ
.223 (5.56 mm), M193 Ball, 55 gr
7.62 x 39 mm, Ball (Soviet)123gr



CERAMIC

MONOLITHIC
(LEVEL IV)

SIZE: 10" x 12" (25cm x 30cm
WEIGHT: 7 lbs (3.2 kilos)
THICKNESS: 3/4" (1.9 cm)

DEFEATS:

All above including Armor Piercing

The plates are curved to fit as close as possible to the body. Dual Hardness Steel Plates will withstand multiple hits with virtually no penetration and some stress cracks in the armor.

Ceramic plates can be struck with multiple hits within 2"(5cm) of each other.

T. G. Faust Inc.
120 N. 8th St. • Reading, PA 19601 • U.S.A.
Phone: (215) 375-8549 • TWX: 510-651-0247 • Cable: TAFCO

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	Steel 500 BHN	11	54	6.86	0.270	148	13.75
	Dual hard steel	9	44	5.6	0.22	54	45
	Aluminum	14	68	25	0.985	226	21
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	Alumina Al_2O_3/GRP	8.1	39	14.0	0.55	300	27.90
	Alumina Al_2O_3/Kevlar®	7	34	13.6	0.53	463	43
Fragments 250 grains 3000 ft/sec (915 m/sec)	GRP	15	73	36	1.42	848	78
	Kevlar®	9.5	46	36	1.42	1534	142
	Aluminum	14.5	71	25.4	1.0	242	22
	Aluminum/Kevlar®	11	54	24	0.95	473	44
	Aluminum/GRP	13.5	66	27	1.08	392	36
	R_c 55-56 steel	22	107	14	1.54	474	44
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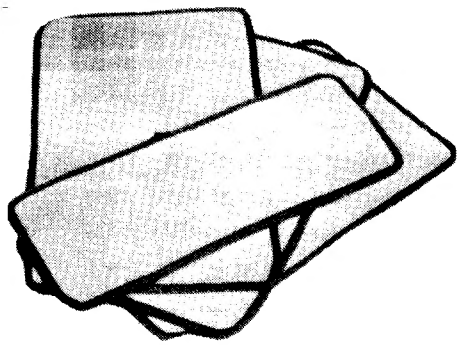
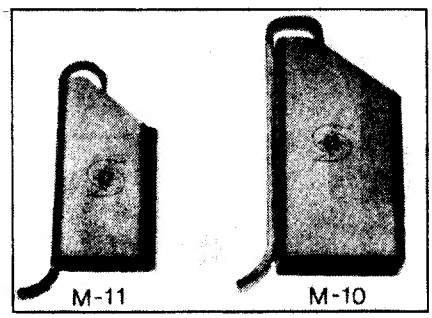


Kevlar Inserts

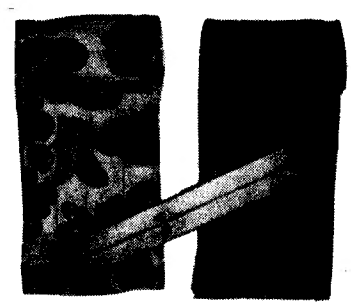
This material was developed by one of the country's leading chemical companies as a tough fiber-like substance which, when layered, will provide a bullet-proof panel. Most of the flak vests on the market today use this material in forming their hard, nonpliable body armor. Notice that we leave ours soft for the sake of movement.

The Ingram Magazine Loading Tool

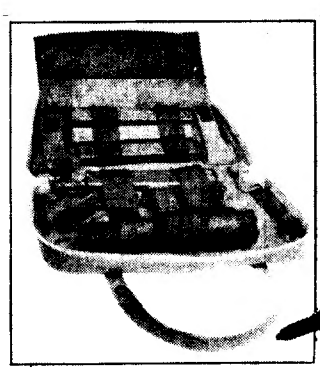


An essential tool for loading the M-10/SM-10 .45 cal., and M-11/SM-11 .380 cal. magazines. Compact and easy to carry, these loading tools are essential for ease of loading. Whether loading in the field or loading at home, these loading tools will prove to be a most valuable asset. (The 9mm does not require a loading tool.)

Ingram Magazine Pouches



We manufacture various magazine pouches for the INGRAM submachine gun and semiautomatic pistols. They vary in size, caliber and capacity. Shown in this illustration are the three-cell and four-cell pouches. Available in either solid or camouflage patterns.

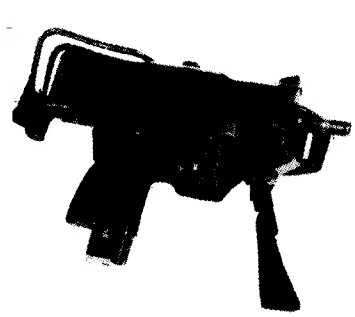


R.P.B. SWAT Case

For use with INGRAM guns. SWAT cases will accommodate one M-10 or M-11, three magazines, one suppressor or barrel extension, loading tool and cleaning accessories. The case is also a very effective bulletproof vest when Kevlar panels are inserted and the case worn in the manner shown.

The M-10 Leather Holster

What could be handier than carrying your M-10, in 9mm or .45 cal., on your hip, ready for immediate action. Will accommodate the larger M-10 submachine gun or SM-10 semiautomatic pistol. Belt loops fit most larger size belts.



The M-11 and SM-11 Cut-Away Holster

Originally manufactured to fill special government needs. Quick release double snap makes it one of the fastest SMG holsters on the public market. Made of the same fine leathers as our other holsters. Available in black only.